

WHAT IS CLAIMED IS:

1     1.     An apparatus for longitudinally orienting elongated strands  
2             of a bulk material, said apparatus comprising:

3             a plurality of vertically extending orienting elements  
4             that form orienting passages therebetween adapted to have  
5             said elongated strands flow therethrough in a  
6             longitudinally oriented manner;

7             a drive connected to at least some of said orienting  
8             elements to move the same; and

9             a conveyor arrangement that is located below said  
10            orienting passages to receive said elongated strands  
11            thereon and that is adapted to convey said elongated  
12            strands in a conveying direction;

13            wherein at least a first group of said orienting  
14            elements are adjustable relative to a second group of said  
15            orienting elements so as to adjust respective widths of  
16            said orienting passages in an adjustment direction  
17            perpendicular to said conveying direction.

1     2.     The apparatus according to claim 1, wherein said orienting  
2             elements comprise discs, said apparatus further comprises  
3             a rotatable shaft on which said discs are mounted parallel  
4             to one another to form a respective disc roll, and said  
5             shaft is oriented with an axis thereof parallel to said  
6             adjustment direction.

1     **3.**     The apparatus according to claim 1, wherein said orienting  
2           elements comprise at least one of guide walls and discs,  
3           and wherein said drive is a rotating drive or a vertical  
4           motion drive that is coupled to at least one of said guide  
5           walls and said discs.

1     **4.**     The apparatus according to claim 1, wherein said widths of  
2           said orienting passages are at most one half of an average  
3           length of said elongated strands.

1     **5.**     An apparatus for longitudinally orienting elongated strands  
2           of a bulk material, said apparatus comprising:

3           a plurality of disc rolls that each respectively  
4           include a rotatable shaft extending axially in an axial  
5           direction, and a plurality of discs arranged on said shaft  
6           parallel to each other vertically and perpendicularly to  
7           said axial direction and spaced apart from one another  
8           along said axial direction;

9           a rotation drive coupled to said disc rolls to rotate  
10          said disc rolls; and

11          a conveyor arrangement that is located below said disc  
12          rolls to receive said elongated strands thereon and that is  
13          adapted to convey said elongated strands in a conveying  
14          direction perpendicular to said axial direction;

15          wherein said discs form vertical orienting passages  
16          therebetween adapted to have said elongated strands flow  
17          therethrough in a longitudinally oriented manner onto said  
18          conveyor arrangement located therebelow; and

wherein at least a first group of said discs are adjustable in said axial direction relative to a second group of said discs so as to adjust respective widths of said orienting passages in said axial direction.

6. The apparatus according to claim 5, wherein each respective one of said orienting passages is formed between two of said discs that are adjacent to each other in said axial direction and that are respectively components of two of said disc rolls that are adjacent to each other in said conveying direction, and wherein said width of said respective orienting passage is given by an adjustable spacing between said two discs in said axial direction.

7. The apparatus according to claim 6, wherein said two of said disc rolls are arranged so that said discs of one of said two disc rolls overlappingly intermesh in axial interspacings between said discs of the other of said two disc rolls.

8. The apparatus according to claim 5, wherein said discs of each one of said disc rolls are all spaced uniformly apart from one another by equal interspacing distances in said axial direction.

9. The apparatus according to claim 5, wherein said plurality of disc rolls includes at least three of said disc rolls, and wherein said first group of said discs that are

adjustable are said discs of at least one of said three disc rolls.

10. The apparatus according to claim 5, wherein said first group of said discs are fixedly mounted on said shaft of an adjustable one of said disc rolls, wherein said shaft of said adjustable one of said disc rolls is axially adjustable in said axial direction relative to another one of said disc rolls.

11. The apparatus according to claim 5, wherein said first group of said discs that are adjustable are axially movably mounted on said shaft of one of said disc rolls so as to be movable in said axial direction along said shaft.

12. The apparatus according to claim 5, wherein an axial range of adjustability of said first group of said discs that are adjustable extends maximally to an axial interspacing distance between successive ones of said discs on a respective one of said shafts.

13. The apparatus according to claim 5, wherein said first group of said discs are manually adjustable in said axial direction.

14. The apparatus according to claim 5, further comprising an adjustment drive coupled to said first group of said discs

and adapted to provide a power-driven adjustment of said first group of said discs in said axial direction.

15. The apparatus according to claim 5, further comprising a housing in which said disc rolls are arranged to form a strand spreader head, and wherein said conveyor arrangement comprises a forming belt arranged below said housing.

16. The apparatus according to claim 5, wherein said widths of said orienting passages are at most one half of an average length of said elongated strands.

17. The apparatus according to claim 5, wherein all of said discs have the same diameter.

18. The apparatus according to claim 5, wherein said first group of said discs can be adjusted to simultaneously form two different sizes of said orienting passages having different dimensions of said widths in said axial direction respectively between said discs of said first group and said discs of said second group alternately in succession in said axial direction.

19. The apparatus according to claim 5, wherein said second group of said discs are said discs of a first one of said disc rolls in said conveying direction, said first group of said disc are said discs of a second one of said disc rolls in said conveying direction, said plurality of disc rolls

6 further includes a third disc roll and a fourth disc roll,  
7 said discs of said fourth disc roll are adjustable relative  
8 to said discs of said third disc roll, and said discs of  
9 said fourth disc roll are adjusted differently than said  
10 discs of said second disc roll so as to form a different  
11 dimension of said width of said orienting passages between  
12 said first and second disc rolls compared to said width of  
13 said orienting passages between said third and fourth disc  
14 rolls.

1 **20.** The apparatus according to claim 19, wherein said width of  
2 said orienting passages between said first and second disc  
3 rolls is adjusted smaller than said width of said orienting  
4 passages between said third and fourth disc rolls.

1 **21.** A method of using the apparatus according to claim 1,  
2 comprising the steps:  
3 a) feeding a bulk flow of said bulk material comprising  
4 said elongated strands onto said orienting elements;  
5 b) driving said at least some of said orienting elements  
6 with said drive to cause a rotating or oscillating  
7 motion of said at least some of said orienting  
8 elements, and to cause said elongated strands to flow  
9 downward through said orienting passages and to  
10 thereby be oriented longitudinally in said  
11 longitudinally oriented manner;

- 12           c)   depositing   said   elongated   strands   in   said  
13               longitudinally oriented manner extending along said  
14               conveying direction onto said conveyor arrangement;  
15           d)   conveying said elongated strands with said conveyor  
16               arrangement; and  
17           e)   before or during said steps a), b) and/or c),  
18               adjusting said first group of said orienting elements  
19               relative to said second group of said orienting  
20               elements so as to adjust said widths of said orienting  
21               passages in said adjustment direction, dependent on at  
22               least one of geometric dimensions of said elongated  
23               strands, dimensional tolerances of said elongated  
24               strands, and a flow rate of said feeding of said bulk  
25               flow.